EK-OTK50-UG-004

TK50 Tape Drive Subsystem

User's Guide

digital

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User's Guide

Prepared by Educational Services
of Digital Equipment Corporation

1st Edition, February 1985
2nd Edition, July 1985
3rd Edition, February 1986

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CHAPTER 1
INTRODUCTION TO THE TK50

The TK50 is a powerful streaming tape drive which can store 94 million bytes (characters) on each of its associated tape cartridges (formatted). It runs with Digital computer systems such as the MicroPDP-11 and MicroVAX II. While the TK50 is physically small, it has much of the functionality of Digital's larger magnetic tape drives, such as the TU81.

Since the TK50 is a relatively new type of device, how to use it may not be immediately obvious. You should read this manual completely first, then perform the procedures in Chapters 2 and 3. The TK50 Tape Drive Subsystem User Reference Card (EK-OTK50-RC) is provided as a reminder after you become comfortable with using the drive.

The TK50 uses a tape cartridge (labeled CompacTape) that contains the magnetic tape on a single reel. This is an important concept to understand, because it directly affects the use of the TK50. The magnetic tape is the medium that stores the data.

When the tape cartridge is loaded into the drive, the tape is automatically threaded onto a reel inside the drive. If the tape is fully wound onto the reel inside the drive, it can take up to 90 seconds to rewind. It must be fully rewound into the cartridge before the cartridge can be removed.

This method is different from a video cassette recorder (VCR) in that a VCR tape can be ejected at any time -- it does not have to be rewound first.

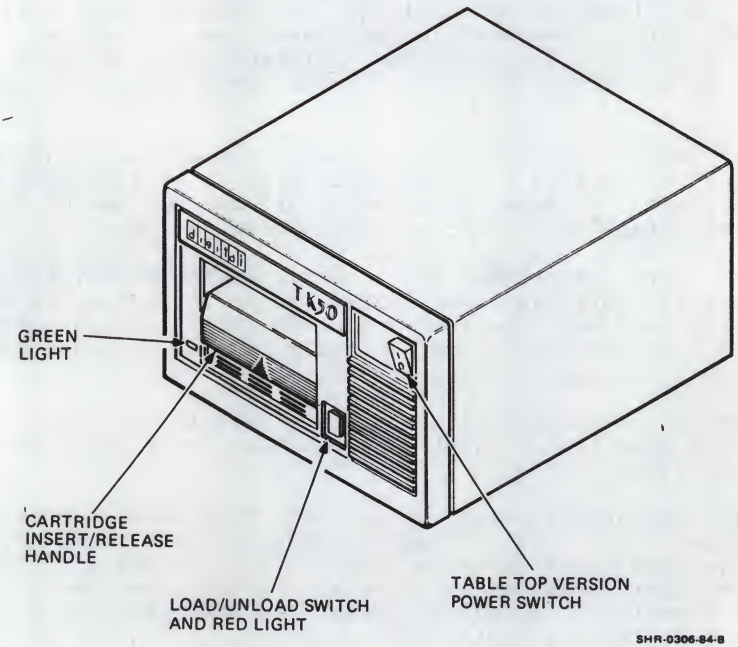
Two main components make up the TK50 Tape Drive Subsystem: the TK50 Drive Unit, and a single printed circuit board controller that plugs into a host computer system (such as the Micro/PDP-11). The controller provides an interface between the tape drive unit and the computer's central processor. An interface cable connects the tape drive to the controller.

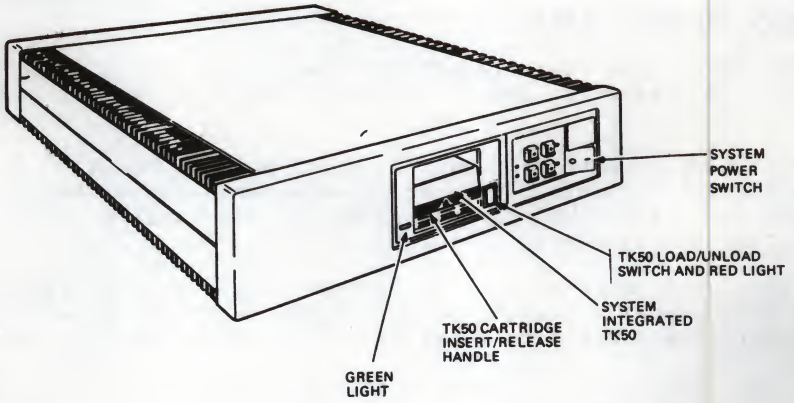
There are two possible versions of the TK50.

1. It can be integrated into the system unit of various Digital computers (certain models of the Micro/PDP-11 and MicroVAX are among them).

2. It can be a tabletop version where the TK50, residing in a separate housing, plugs into the rear bulkhead of Digital computer systems. A variation on the tabletop version allows the TK50 to be mounted in a rack (see the TK50-D, TK50-R Tape Drive Subsystem Owner's Manual, EK-LEP05-OM.)

NOTE: Most of the illustrations in this manual show the tabletop version of the TK50. The operating principles of the TK50 are the same, whether you have the tabletop or system-integrated version.




SYSTEM
POWER
SWITCH
TK50 LOAD/UNLOAD
SWITCH AND RED LIGHT
SYSTEM
INTEGRATED
TK50
TK50 CARTRIDGE
INSERT/RELEASE
HANDLE
GREEN
LIGHT
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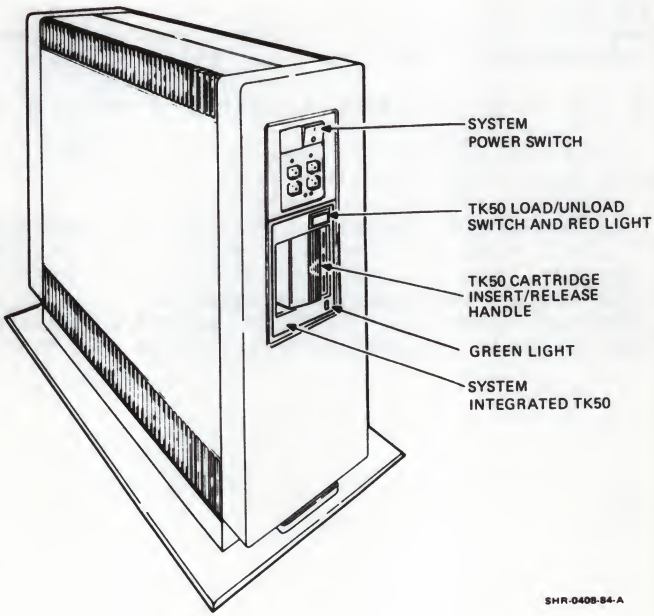
SYSTEM
POWER SWITCH
TK50 LOAD/UNLOAD
SWITCH AND RED LIGHT
TK50 CARTRIDGE
INSERT/RELEASE
HANDLE
GREEN LIGHT
SYSTEM
INTEGRATED TK50
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ABOUT THE TAPE CARTRIDGE

The TK50 tape cartridge is a 4 inch by 4 inch plastic cartridge that is inserted into the TK50 tape drive. It is labeled CompacTape.

The tape cartridge has a write-protect switch to prevent accidental erasure of important data. When the switch is moved to the left and the orange indicator is visible, data cannot be written to the tape.

Inside the cartridge is a 600-foot single reel of magnetic tape, on which data is stored. At the beginning of the tape is a plastic leader. There are some rules to follow about the tape cartridge.

- Do not drop the cartridge. This may cause the leader to be displaced, in which case the tape cartridge is unusable, and it may damage the drive. (See Chapter 2 -- Inspecting a Cartridge.)

- If the tape cartridge has been exposed to extremes of heat or cold, let it stabilize at room temperature for the same amount of time -- up to 24 hours.

- Do not touch any exposed portion of magnetic tape.

Table 1-1 lists the available documentation (other than this book) for the TK50 Tape Drive Subsystem.

In addition to these manuals, the system manuals that cover various Digital computer systems contain information on how to install, use, and fix the TK50 Tape Drive Subsystem. For example, if the TK50 tape drive subsystem comes packaged in a version of the Micro/PDP-11 computer, then the system manuals shipped with the Micro/PDP-11 have information relating to the TK50.

Table 1-1 TK50 Subsystem Documentation

Document and Part Number	Description
TK50-D, TK50-R Tape Drive Subsystem Owner's Manual (EK-LEP05-OM)	Provides installing, servicing, using, and programming information for the tabletop or rackmount versions of the TK50.
Mass Storage Tabletop Enclosure Service Guide (EK-LEP05-SG)	Provides maintenance, troubleshooting, and repair information for the TK50 Subsystem (tabletop or rackmount version). It is used by Digital Field Service personnel.
TK50 Tape Drive Subsystem Technical Manual (EK-OTK50-TM)	Provides technical detail, theory of operation, and troubleshooting information about the TK50.
TK50 Tape Drive Subsystem Illustrated Parts Breakdown (IPB) (EK-OTK50-IP)	Illustrates and lists the various components and subassemblies that make up a TK50.

TERMS USED IN THIS MANUAL

Cartridge leader — A plastic leader at the beginning of the magnetic tape. Consider that the mating of the leaders (one of which is inside the cartridge, the other inside the drive) is like the threading of a needle. The leader inside the cartridge serves as the "eye" of the needle. This leader may be either black or white.

Take-up leader — A plastic leader inside the TK50. After the take-up leader mates with the cartridge leader, it draws the magnetic tape out of the cartridge and onto the take-up reel inside the tape drive. As the tape is wound onto the take-up reel, it passes the magnetic read and write heads. These heads let the TK50 perform its function: to write and read data to and from the magnetic tape.

Cartridge insert/ release handle — This handle is used to set the internal mechanisms of the TK50 to accept or eject the tape cartridge. The handle is raised before inserting a cartridge, lowered during use, and raised again to eject the cartridge.

Insertion	The act of placing the tape cartridge in the TK50. It is during insertion that the cartridge leader and take-up leader mate. Before insertion it is important (especially the first time the cartridge or drive is used) to inspect the positions of both the cartridge leader and take-up leader. Refer to Chapter 2 for instructions.
Load	When the tape cartridge has been correctly inserted, the tape is brought to BOT by pushing the Load/Unload switch and releasing it to its In, or load, position.
Unload	After you finish using the tape cartridge, push and release the Load/Unload switch to its Out position. The tape rewinds to BOT, then to its unload point. Now you can lift the handle and remove the cartridge from the tape drive.
BOT	Beginning of Tape. It is the first spot on the magnetic tape where data can be written. BOT is set automatically. You need perform no functions in regard to BOT.
Write protect switch	A switch on the TK50 tape cartridge used to prevent data from being written on the tape. In its protected position, a small orange indicator is visible on the front of the tape cartridge. In its enabled position, there is no orange dot visible and data may be written to the cartridge.

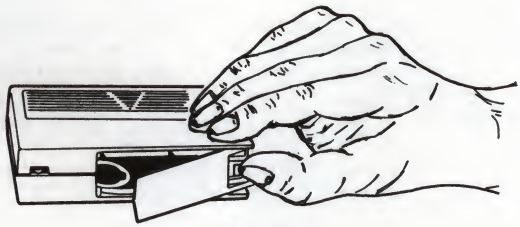
CHAPTER 2
INSPECTING AND LOADING A TAPE CARTRIDGE

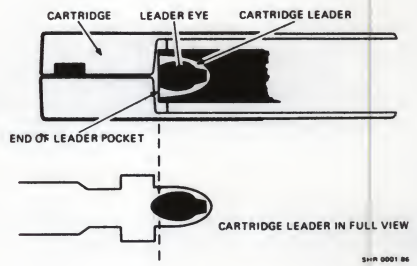
This chapter is a 10-step procedure that explains how to inspect and label a tape cartridge, turn on power, and load the cartridge into the TK50 Tape Drive.

1. Inspect the tape cartridge.

Always inspect the tape cartridge before you use it for the first time. Open the cartridge door by releasing the door lock with your thumb. The tape leader inside the cartridge should be positioned exactly like the one shown in the figure below. The cartridge leader may be either black or white.

CAUTION: If the leader is not positioned exactly as that shown below, do not use this cartridge. It may damage the drive. Do not pull the leader. Do not drop the tape cartridge.

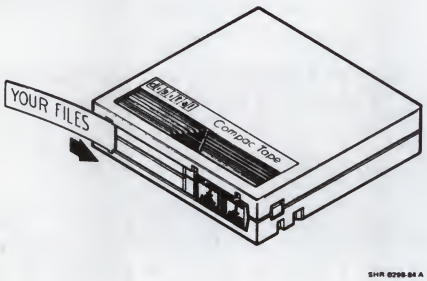




2. Label the tape cartridge.

Always label the tape cartridge you're using, so that later you'll know what information is on the tape.

There is a slot on the front of the tape cartridge for a slide-in label.



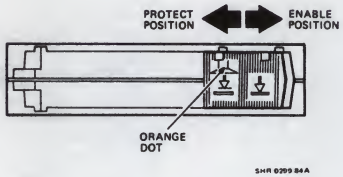
CAUTION: Use only the label slot provided to label a tape cartridge. Do not use stick-on labels on the top, bottom, or sides of the tape cartridge.

3. Write protect the tape cartridge (to protect data).

You can prevent the information on the tape from being overwritten by "write-protecting" the tape. To write protect the tape, slide the write protect switch (on the front of the tape cartridge) to the left. A small orange dot is visible on the switch when it is in the protected position.

If you are using the TK50 as a back-up device, leave the switch in the write enabled position when data is to be written to it.

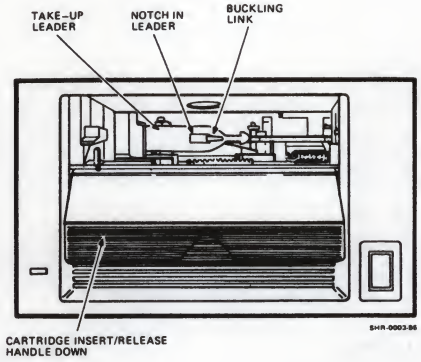
If you are using the TK50 to read software or data from the tape, place the switch in the write-protected position.

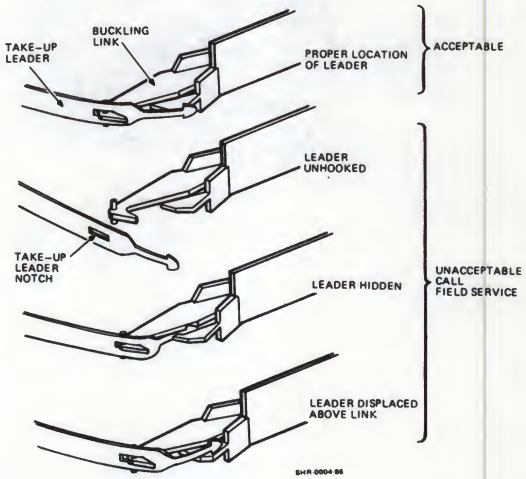


4. Inspect the take-up leader inside the TK50.

Make sure that the take-up leader inside the tape drive is in the correct position, as shown below. Since the take-up leader in the TK50 must mate with the leader inside the tape cartridge, it is important that both are in their correct positions.

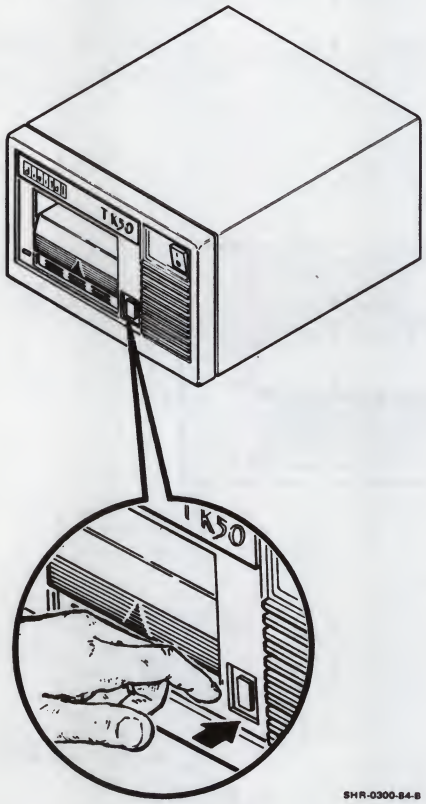
CAUTION: Do not try to fix the take-up leader inside the tape drive. If it is not in the correct position, call Digital Field Service.





5. Set the LOAD/UNLOAD switch to UNLOAD.

Before turning on power, make sure the LOAD/UNLOAD switch is in the UNLOAD (out) position.



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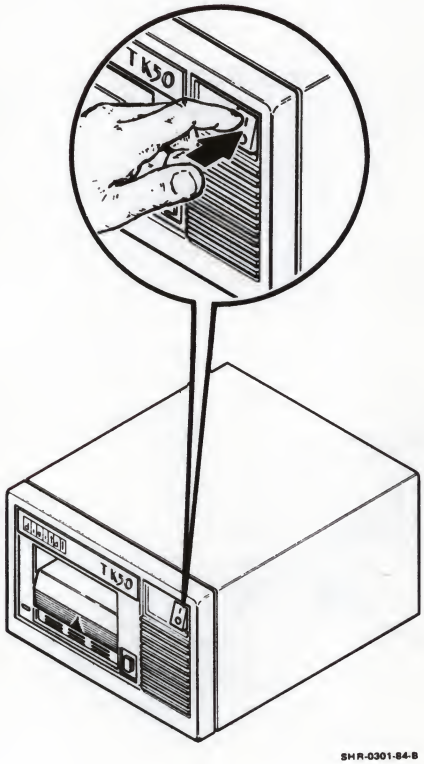
6. Watch the lights and turn on the power.

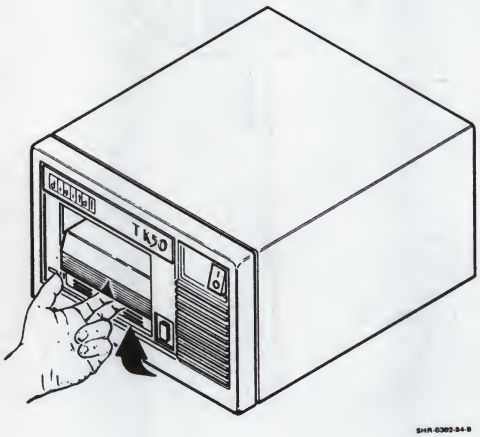


Turn on the power to the TK5Ø. The tape drive's red light goes on steady for about 5 to 15 seconds (while it runs an internal self-test), then goes off. The green light comes on. If at any time the red light flashes rapidly, there is a problem with the TK5Ø. Refer to Chapter 5.

7. When the green light goes on (the red light is off), lift the cartridge insert/release handle.

If you have a TK50 that is mounted vertically in a floor stand computer system, "lifting" the cartridge insert/release handle means pulling it to the left.

CAUTION: Never lift the cartridge insert/release handle when the red light is on or blinking or you may cause a fault or damage the unit.



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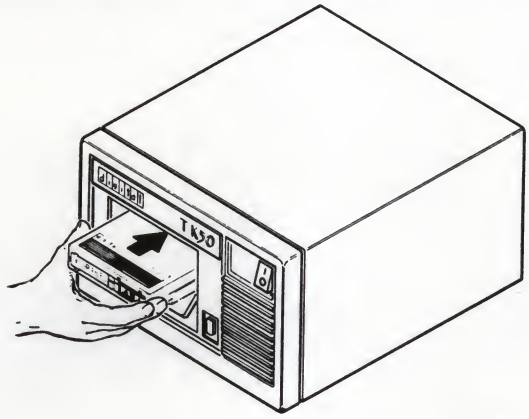
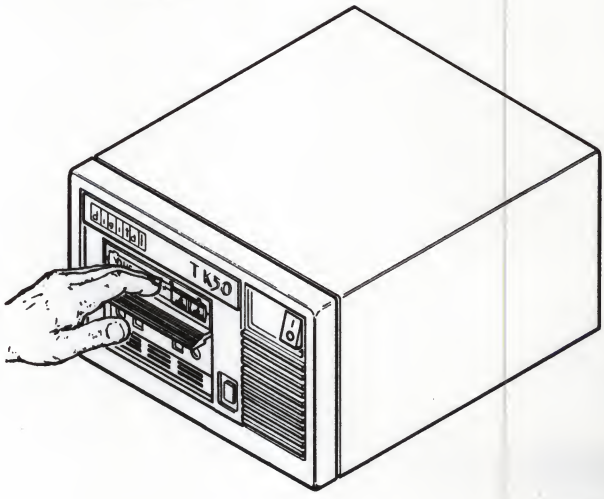
Before performing step 8, read the Caution.

8. Smoothly and completely insert the tape cartridge.

Hold the tape cartridge with the arrow on top, pointing away from you. Make sure the label is facing you. Place the cartridge partially into the drive as shown in the first part of the figure below. Push the cartridge (as shown in the second part of the figure) into the drive, smoothly and firmly, until it locks in place inside the drive. Now the red light turns on and the green light goes off.

CAUTION: You will feel some resistance as you push the cartridge into place. It is very important NOT TO STOP AT THIS POINT, BUT TO CONTINUE TO PUSH THE CARTRIDGE FIRMLY UNTIL IT LOCKS IN PLACE.

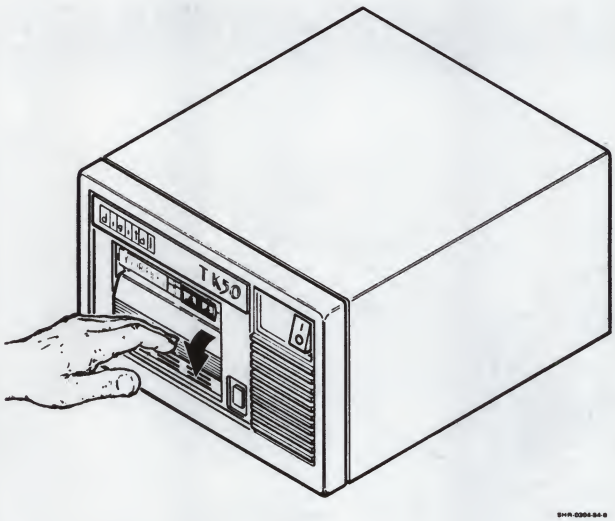




9. Lower the cartridge insert/release handle to locked (closed) position.

After a delay of several seconds, the green light turns on steady, the red light turns off.

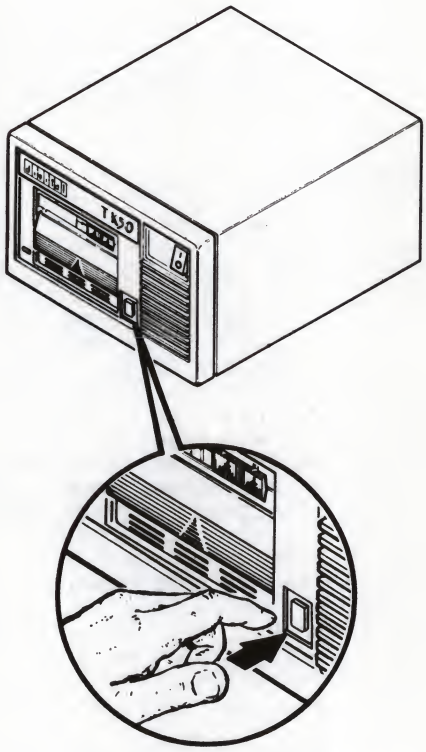
At this point, you can remove the tape cartridge by lifting the handle, or go on to the next step.



10. Set the LOAD/UNLOAD switch to LOAD (In Position).

Push in the LOAD/UNLOAD switch. The tape goes through a load process that takes between 5 and 7 seconds. Both lights come on steady as the tape reaches BOT (the beginning of usable tape).

The tape cartridge is now ready to use.



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A RUNNING TK50

While the TK50 tape drive is reading or writing data to the magnetic tape, the red light stays on steady while the green light flashes.

CAUTION: Never move the cartridge release handle while the red light on the TK50 is on or blinking or you may cause a fault or damage the unit.

LIGHTS

Refer to Table 2-1 for a summary of the lights.

Table 2-1 Light Definitions

Green	Red	Drive State
Off	Off	Power off.
Off	On	1. After power-on this condition occurs for 5 to 15 seconds while the drive is initializing. (Red goes off and green comes on after initialization.) 2. Indicates handle is up following cartridge insertion. 3. Indicates tape has almost completed rewinding and is approaching the unload point. Light stays on during this sequence (8 to 10 seconds).
On	Off	Okay to lift handle. NOTE: Only under this condition can you lift the handle. Under any other condition, lifting the handle may damage the unit or cause a fault.
On	On	Tape at BOT and drive ready to accept system commands.
Flashing	On	Indicates tape motion during normal system operation.
Flashing	Flashing	Tape is rewinding to BOT.
Off	Fast flashing	Indicates fault condition. See Chapter 5, Solving Problems. Pushing the LOAD/UNLOAD switch four times may clear the fault.

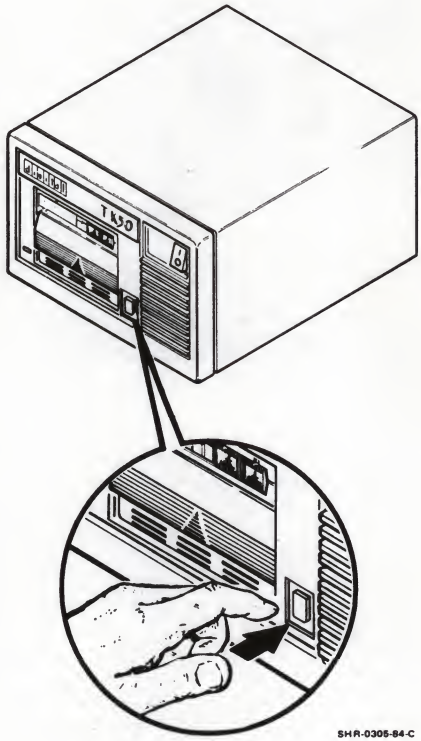
CHAPTER 3
UNLOADING THE TAPE CARTRIDGE

This chapter explains how to remove the tape cartridge from the drive.

1. Set the LOAD/UNLOAD switch to UNLOAD (OUT position).

If the tape is not already at BOT, both lights flash slowly while the tape is rewinding.

If very little tape was in the drive when you set the unload switch, you may not see the lights flash when the tape is rewinding. Whether or not you see the flash depends on how much of the tape was out on the take-up reel inside the drive.



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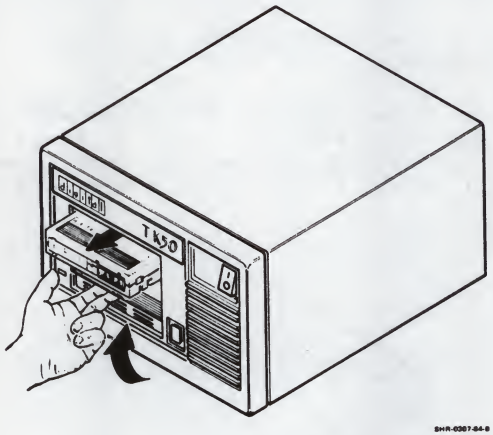
The red light comes on steady while the tape is unloading. The unload process takes between 8 and 10 seconds to complete. After the tape unloads, the red light goes off and the green light comes on. It is now safe to remove the tape cartridge.

2. After the red light goes off and the green light goes on, lift the cartridge insert/release handle. If you have a system integrated TK50 mounted vertically in a floor stand computer, "lifting" the handle means pulling it to the left.

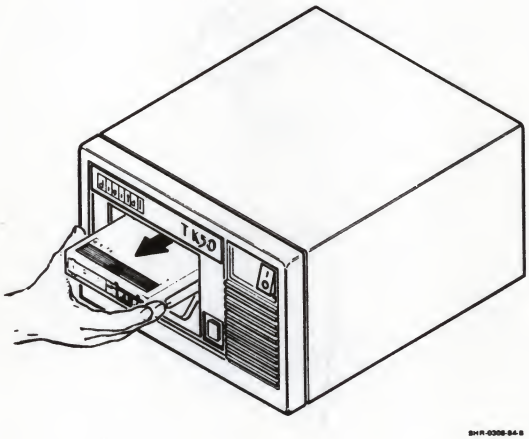


The tape partially ejects.

CAUTION: Never lift the cartridge release handle while the red light is on or blinking or you may cause a fault or damage the unit.

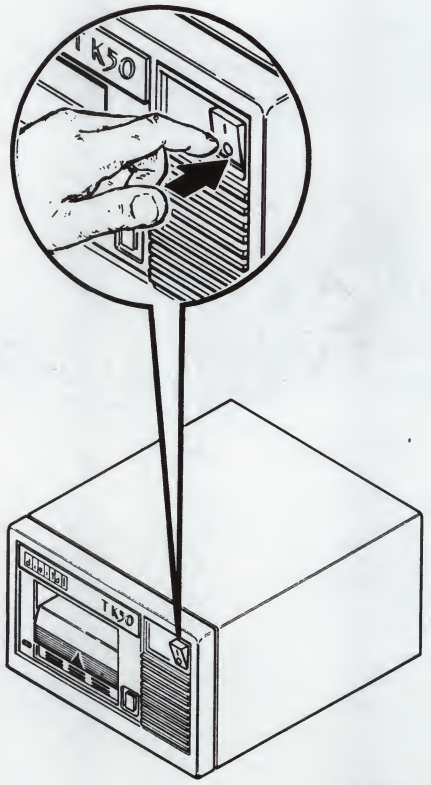
3. Remove the cartridge and return it to its protective case.

CAUTION: Remove the tape cartridge from the drive before turning power off. Damage may occur if the tape drive is moved with a cartridge inserted and power is off.



4. Turn the power switch off (0 position). Push the cartridge insert/release handle down.

Whenever you turn the power off in a tabletop unit, you'll hear some whistling and whirring noises. Don't worry, this is normal.



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CHAPTER 4
USES FOR THE TK50

This chapter describes ways you can use the TK50 Tape Drive Subsystem.

To inform your operating system that the TK50 is a legal device on which you can write data, you may have to perform a one-time system generation (SYSGEN) or configure (CONFIG) operation. Refer to your operating system manuals for instructions on how to perform a SYSGEN or CONFIG. See Chapter 6, Programming.

AS A BACK-UP DEVICE

You can use the TK50 as a back-up device by copying files from another device (usually a fixed disk drive such as an RD51 or RD52), onto the TK50's cartridge. The TK50's large storage capacity makes it much easier to use for large backup operations than floppy disks, because it can store much more information.

To back up a file onto the TK50, you must run a "utility program" under your operating system that copies data from one device to another. Most operating systems have a variety of utility programs that can transfer files between devices. Refer to your operating system user manual for instructions on how to perform a back up or file copy operation.

AS A SOFTWARE DISTRIBUTION MEDIUM

The TK50 is ideal as a software distribution medium because an entire operating system can be stored on one cartridge. Rather than using many floppy disks to load an operating system onto your computer, you can use one TK50 cartridge. When used this way, the TK50 is almost exclusively a "read-only" device, which means that you won't be writing data to the cartridge. If you are using the TK50 to load software on your system, make sure that the tape cartridge is write protected.

AS A "JOURNALING" DEVICE

Due to its large storage capacity, the TK50 is ideal for systems where large amounts of data are sequentially written to a peripheral device. An example of this is a system used for monitoring a process over a long period of time. The data gathered can be sequentially written to the TK50 cartridge, then, at a convenient time, the cartridge can be removed and the data read back onto another system for analysis.

CHAPTER 5
SOLVING PROBLEMS

If the TK50 tape drive fails its self-test when you turn on the computer's power or detects a fault during operation, the red light flashes rapidly. Try to reset the fault by pushing the LOAD/UNLOAD switch four times. If the fault does not happen again, it is safe to continue. If the fault returns, then do one of the following.

- If you have the tabletop version of the TK50, try turning the power off, then back on. Do this only once. If the failure doesn't happen again, it is safe to continue. You'll hear some whistling and whirring noises when you turn off the TK50's power. This is normal.
- Report the problem to the system administrator.
- Call your Digital Field Service Representative.
- Follow the procedures in your system manuals for removing the tape drive from the system, to have it repaired at a Digital Service Center. See Chapter 7 -- Servicing.

TK50 SUBSYSTEM FAILURES

If the TK50 tape drive subsystem is not working correctly, yet the tape drive unit itself passes its power-on self-test, the problem may be the tape drive controller that is in the computer.

One way to isolate the problem is to run system diagnostic programs. Your system manuals provide instructions on how to run these diagnostic programs. The diagnostic programs include a comprehensive test of the TK50 subsystem. These diagnostics are not available unless you have signed a licensing agreement with Digital. Contact your Digital representative for more information.

If you have TK50 diagnostics, run them. If not, contact your Digital Field Service Representative.

If the TK50 subsystem controller board is the failing component, call Digital Field Service to have the controller replaced. Do not replace the controller yourself. If you do, you will void your service contract and warranty, unless you have a self-maintenance agreement with Digital.

WARNING: Removing the controller can be very dangerous. To ensure safety during servicing, THE POWER SWITCH MUST BE OFF AND THE AC POWER CORD DISCONNECTED FROM BOTH THE WALL OUTLET AND THE BACK OF THE SYSTEM.

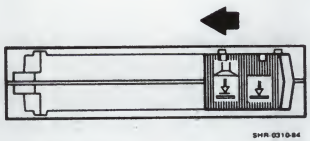
Diagnostic Failure with a Tape Cartridge Inserted

If the red light on the TK50 begins to flash rapidly during operation, the subsystem has detected an error. Depending on the type of error encountered, you may be able to clear the fault by pushing the load/unload switch four times. To remove the tape from the drive, place the switch in the UNLOAD position (Out).

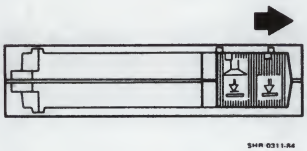
If the fault can be corrected, the tape starts to rewind (and both lights begin to flash slowly). If the red light continues to flash rapidly, the error is not correctable. Try this operation two or three times.

Read/Write Errors

If your computer system is reporting read or write errors that relate to the TK50, the problem may be with the tape. If your system is reporting write errors, the tape may be write protected. Check that the write protect switch on the tape cartridge is in the enabled position.



Tape Cartridge Write Protected



Tape Cartridge Write Enabled

Information on a tape can still be read by the system when the tape is write protected. If you have read errors, or if write errors continue to occur when the tape is write enabled, try another tape cartridge.

System Problems Caused by TK50

If you suspect that the TK50 has caused your system to fail during operation, set the LOAD/UNLOAD switch to its UNLOAD (out) position. The tape will rewind to its UNLOAD position. Follow the procedures for removing the tape from the drive. (See Chapter 3, steps 1 through 4.)

The TK50 Tape Drive Subsystem runs with Digital's
Storage Control Protocol (TMSCP).

LEGAL NOTICE: TMSCP and STI protocols and documentation
proprietary information of Digital Equipment Corpo
UNIBUS/Q-BUS/BI-BUS port drivers and documentation for MSC
products are also proprietary information of Digital Equ
Corporation.

The standard base address for the subsystem is 774500 (oct
This is the location of the Initialization and Polling
register. The Status and Address (SA) register is at locat
774502 (octal).

Interrupt vectors are software settable. The standard interru
vector for the first TK50 Tape Drive Subsystem is 260.

The addresses and interrupt vectors for TK50s on your system
depend on your system configuration. If you have more than one
TMSCP device (that is, TU81, TK50) on your system, you will need
to use the appropriate software tools to determine the addresses
and interrupt vectors for each device. In VMS systems, use the
SYSGEN utility; its use is described below. In PDP-11 systems, the
appropriate tool is the Float diagnostic, which is run under the
XXDP+ diagnostic supervisor. Refer to the PDP-11 Architecture
Handbook (EB-23657-18), Appendix A (Assignment of Bus Addresses
and Vectors). Refer also to the XXDP+ Operating Manual.

EN PROCEDURE

letermine the proper device address for a VMS based system, use 'SYSGEN' utility. The sysgen utility and VMS use the same es for address selection.

determine the proper addresses for the TMSCP and MSCP devices, rst determine the existing system components. The following list ows some of the possible options and the symbols by which the SGEN utility recognizes them. These options can be entered into YSGEN for address calculation; more will be added as the products ecome supported under future versions of the VMS/MicroVMS perating systems.

Device	Symbol	Device	Symbol	Device	Symbol
QDA5Ø	UDA	TU81	TU81	DEUNA	UNA
RQDX1	UDA	TK5Ø	TU81	DEQNA	QNA
RQDX2	UDA	DZV11	DZV	LVP11	LP
RQDX3	UDA				
RRD5Ø	UDA				

When you have listed the components, use the following steps to determine the proper MSCP device address for a VMS system:

1. On a running VAX/VMS system, enter the SYSGEN utility after logging onto the system. This is done as follows:

   ```
   $ MC SYSGEN <CR>
   SYSGEN>
   ```

2. Enter the configuration section of SYSGEN

   ```
   SYSGEN> CONFIGURE <CR>
   DEVICE>
   ```

3. At the DEVICE prompt (from the SYSGEN utility), key in the list of Q-bus or Unibus options present on the VAX system. Make sure that the device count is correct; for example, any MSCP disk controller (UDA, KDA, RQDX3, RRD5Ø) looks to the system like a UDA, and any host-based TMSCP controller looks like a TU81. For example, a system with a DEQNA, two TK5Øs, a KDA and an RQDX3 would be entered as shown.

   NOTE: Make sure all devices connected to the host have been listed.

   ```
   DEVICE> QNA
   DEVICE> TU81 2
   DEVICE> UDA 2
   ```

4. When ALL devices have been entered, press CTRL Z to end the input session and have the SYSGEN utility calculate the proper addresses for the set of hardware you have entered.

```
DEVICE> CTRL Z
DEVICE: UDA     NAME: PUA  CSR: 772150   Vector: 154   Support: yes
DEVICE: TU81    NAME: PTA  CSR: 774500   Vector: 260   Support: yes
DEVICE: QNA     NAME: XQA  CSR: 774440   Vector: 120   Support: yes
DEVICE: UDA     NAME: PUB  CSR: 760334*  Vector: 300*  Support: yes
DEVICE: TU81    NAME: PTB  CSR: 760444*  Vector: 350*  Support: yes

SYSGEN> EXIT
$
$
```

5. Entering EXIT at the SYSGEN prompt allows you to exit from SYSGEN.

CHAPTER 7
SERVICING

If you have decided to have Digital maintain your system, Digital Field Service offers a flexible range of plans to choose from. Select the one that is right for you.

ON SITE SERVICE offers the convenience of repair service at your site and the insurance against unplanned and unbudgeted repair bills. For a small monthly fee, you receive personal service from our service specialists. Usually, within a few hours of your call, the specialist is dispatched to your site with all the parts and test equipment to give you fast, dependable maintenance.

Under basic service, full coverage is available from 8 a.m. to 5 p.m., Monday through Friday. Options are available to extend your coverage to 12-, 16- , or 24-hour days, and to Saturdays, Sundays, and holidays.

If you require uninterrupted operations, you can choose DECservice, a premium On-Site service that guarantees extra-fast response and non-stop remedial maintenance. We don't leave until the problem is solved.

Under basic service and DECservice, all parts, materials, and labor are covered in full.

CARRY-IN SERVICE is for you if you don't need the convenience of On-Site coverage, but do require the same fast, personalized response and the ability to plan your maintenance expenditures, all at an even smaller monthly fee than On-Site service.

When you bring your unit in to one of our 160 Digital Service Centers world-wide, you can be sure that your unit will receive expert repair service from factory-trained personnel. Your unit is guaranteed to be fixed within two days, normally within 24 hours. Carry-In Service is available on selected terminals and systems. Contact your local Digital Field Service Office to determine if this service is available for your unit. Call one of our information numbers for the location of the Digital Field Service Office nearest you.

Digital Service Centers are open during normal business hours, Monday through Friday. For the location of a Service Center in your area, call one of our Field Service Information numbers below.

DECmailer is our service for users who have technical resources to perform the first line of maintenance themselves. DECmailer customers can troubleshoot, identify, and isolate a component causing problems and mail it to our Customer Returns Center. Here, the module receives expert repair and is mailed back to you within five days. With DECmailer service, you are charged for each use, rather than monthly. It is most important that self-maintenance customers use standard static-control procedures when handling any part of the TK50 subsystem.

PER CALL SERVICE is for users who wish to establish a maintenance program on a non-contractual, time-and-materials-cost basis. It is available with either On-Site or Carry-In service, and is appropriate in situations where the user has sufficient expertise to perform first-line maintenance, but may occasionally need in-depth support from Field Service.

PER CALL is also offered as a supplementary program for Basic Service Plan Customers who require remedial maintenance outside their contracted hours of coverage; however, there is no charge for materials in that case.

ON-SITE PER CALL Service is provided on a best effort basis, with a normal response time of two to three days. It is available 24 hours a day, seven days a week.

CARRY-IN PER CALL Service is available during normal business hours, with a turn-around time of two to three days.

For more information on these Digital Service Plans, their prices, and special rates for volume customers, contact your local Digital Field Service Office. Call one of our information numbers for the location of the Digital Field Service Office nearest you.

Digital International Field Service Information Numbers

U.S.A.	1-(800)-554-3333
Canada	(800)-267-5251
United Kingdom	(734) 868711
Belgium	(02) 2425095
West Germany	(089) 95910
Italy	(02) 617961
Japan	(03)-989-7161
France	(6) 0778292
Denmark	(2) 889666
Spain	(1) 7331900
Finland	(0) 423511
Holland	(30) 640293
Switzerland	(01) 8299111
Sweden	(8) 7338000
Norway	(2) 160290
Austria	(222) 6776410
Ireland	(1) 308433
Portugal	(1) 725402

Australia(02) 4125555

APPENDIX A
TK50 TAPE DRIVE SPECIFICATIONS

Mode of operation	Streaming
Read/write method	Serpentine
Recording method	MFM
Recording medium	1/2 inch wide, 600-foot long magnetic tape
Start speed	130 msec min, 300 msec max
Stop speed	90 msec min, 130 msec max
Start distance	5 inch min, 12 inch max
Stop distance	3.5 inch min, 5 inch max
Recording density	6667 bits per inch
Number of tracks	22
Data rate	360 Kbits/sec (45 Kbytes/sec)
Tape speed	75 inches per second
Read time	35 minutes min for a full tape
Storage capacity (unformatted)	131 megabytes
Input voltages	+12 Vdc +/-5% +5 Vdc +/- 5%

Environmental Requirements: Modified Class-B DEC Spec 102

Operating temperature	10 to 40°C (50 to 104°F) non-condensing. Reduced by 1.8°C/1000 ft (1°F/1000 ft) altitudes above sea level.
Non-operating temperature	-30 to 66°C (-22 to 151°F)
Operating/non-operating humidity	10 to 80% RH max wet bulb 28°C (82°F) and min dew point 2°C (36°F)

Physical Specifications

Size	5.75 in X 3.25 in X 8.44 in (not including bezel)
Weight	5 lbs not including cartridge

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